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TITLE OF THE INVENTION

GLIDING OR ROLLING BOARD

INVENTOR

David ADAMCZEWSKI

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GLIDING OR ROLLING BOARD

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is based upon French Patent Application No. 02.12435, filed October 3, 2002, the disclosure of which is hereby incorporated by reference thereto in its entirety and the priority of which is hereby claimed under 35 U.S.C. §119.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The invention relates to the field of gliding or rolling boards adapted to support a user's feet. Such boards are used, for example, for snowboarding, water skiing, skateboarding, or for other sports or activities.

2. Description of Background and Relevant Information

[0003] A board according to the prior art has a length measured along a longitudinal direction of the board between a first end and a second end, as well as a width and a height. Generally, the board has, along its height, a lower reinforcement, an upper reinforcement, and at least one core located between the lower reinforcement and the upper reinforcement. The board also has, from the first end to the second end, a first end zone, a first intermediary zone, a first receiving zone, a central zone, a second receiving zone, a second intermediary zone, and a second end zone.

[0004] As known, the core extends throughout all of the zones of the board. The physical constitution of the core directly influences the mechanical properties of the board, as well as its cost.

[0005] Certain cores are made with materials having a low mechanical strength, or resistance, such as traction strength, and a low cost. These materials can be a plastic cellular foam, such as a polyurethane foam. Such a core is technically easy to manufacture and inexpensive. It allows lowering the cost for manufacturing a board, and essentially fulfills a function of filling the volume between the reinforcements.

[0006] Other cores are made from materials having a higher mechanical strength but also a higher cost. These materials can be made of wood, used in the form of juxtaposed strips, or made of wood core plywood. Such a core is technically more complicated to manufacture and more expensive. It increases the cost for manufacturing a board, but it gives it a good capability for storing and returning the energy that originates from a deformation of the board.

SUMMARY OF THE INVENTION

[0007] An objects of the invention is to configure the core so that, on the one hand, it is capable of storing and returning a large quantity of energy at least in certain cases and, on the other hand, it is relatively inexpensive to manufacture. This involves optimizing the cost to mechanical properties ratio.

[0008] To this end, the invention proposes a gliding or rolling board having a length measured along a longitudinal direction between a first end and a second end, a width measured between a first edge and a second edge, and a height measured between a lower or gliding surface and an upper surface, the board having, in height, namely a first

reinforcement, a second reinforcement, and at least one core located between the first reinforcement and the second reinforcement, the board also having, from the first to the second end, a first end zone, a first intermediary zone, a first receiving zone, a central zone, a second receiving zone, a second intermediary zone, and a second end zone.

[0009] The core of a board according to the invention has a matrix made from a filler material, the matrix having at least one cavity, at least one insert being housed in the cavity of the matrix, in a predetermined zone of the board, the insert having at least one mechanical property greater than that of the matrix, which property can be the tensile or compressive strength, the bending strength, the elastic limit, or the like, so as to locally improve the mechanical properties of the board.

[0010] Each insert is housed in the core to locally improve the mechanical properties thereof.

[0011] For example, a central longitudinal insert, extending from the first receiving zone to the second receiving zone, improves the capability of the board to store and return the energy related to a bending along a transverse axis.

[0012] A lateral longitudinal insert, extending along an edge, improves the capability of the board to negotiate a curve on hard surfaces, such as ice.

[0013] Certain specific capabilities are therefore imparted to the board, which are related to the localization of the inserts, combined with a control of the manufacturing costs related to the use of an economical matrix. The invention optimizes as much as possible the technology of the core and the manufacturing costs.

[0014] Also an object of the invention is a method for manufacturing a gliding or rolling board, in which the core has a matrix made from a filler material, with at least one insert housed in the matrix.

BRIEF DESCRIPTION OF DRAWINGS

[0015] Other characteristics and advantages of the invention will be better understood from the following description, taken with reference to the attached drawings showing, by non-limiting examples, how the invention can be embodied, and in which:

FIG. 1 is a perspective view of a board, according to a first embodiment of the invention;

FIG. 2 is a cross-section along the line II-II of FIG. 1;

FIG. 3 is a cross-section along the line III-III of FIG. 2;

FIG. 4 is a cross-section along the line IV-IV of FIG. 2;

FIG. 5 is a cross-section similar to that of FIG. 3, according to a second embodiment of the invention;

FIG. 6 is a cross-section along the line VI-VI of FIG. 5;

FIG. 7 is a cross-section similar to that of FIG. 2, according to a third embodiment of the invention;

FIG. 8 is a cross-section along the line VIII-VIII of FIG. 7.

DETAILED DESCRIPTION OF THE INVENTION

[0016] Although the following description relates to snowboards, it is to be understood that it also applies to other boards adapted to sporting activities, as mentioned hereinabove.

[0017] The first embodiment of the invention will be described with reference to FIGS. 1-4.

[0018] As known and as shown in FIG. 1, a snowboard 1 has a length measured along a longitudinal direction L, between a first end 2 and a second end 3. The board 1 also has a width measured along a transverse direction, between a first lateral edge 4 and a second lateral edge 5, as well as a height measured between a lower or gliding surface 6 and an upper surface 7.

[0019] The transverse direction is perpendicular to the longitudinal direction L and parallel to the lower surface 6.

[0020] The board 1 also has, from the first end 2 to the second end 3, a first end zone 8, a first contact line W1, a first intermediary zone 9, a first receiving zone 10, a central zone 11, a second receiving zone 12, a second intermediary zone 13, a second contact line W2, and a second end zone 14.

[0021] Each receiving zone 10, 12 is provided to receive a device for retaining a user's foot. The devices, not shown, can be affixed to the board 1 by means, such as screws. Each receiving zone 10, 12 is provided to this end with threaded orifices 15.

[0022] Each of the contact lines W1, W2 is a line that is substantially transverse to the board 1, in an area of which the lower surface 6 contacts a planar surface when the board 1 rests on the surface without an outside influence.

[0023] The height of the board 1 is shown in cross-section in FIG. 2.

[0024] From the lower surface 6 to the upper surface 7, the board 1 has a sole 20, a first reinforcement 21, a core 22, a second reinforcement 23, and a protective layer 24.

[0025] The sole 20 is manufactured, for example, with a plastic material containing polyethylene. The protective layer 24 is manufactured, for example, with a plastic material containing acetyl-butadiene-styrene.

[0026] Each of the reinforcements 21, 23 is preferably includes resin-impregnated fibers. The fibers can be made with any material, or with any combination of materials, such as glass, carbon, aramid, metal, or other material.

[0027] The reinforcements 21, 23 and the core 22 form a sandwich structure that extends along at least 50% of the surface of the board, and preferably substantially along the entire surface. The core 22 substantially occupies the space demarcated between the reinforcements 21, 23 and maintains the distance between the reinforcements 21, 23.

[0028] According to the invention as shown in FIGS. 2-4, for example, the core 22 has a matrix 30 made from a filler material, an insert 31 being housed in the matrix 30, the insert 31 having at least a mechanical property greater than that of the matrix, which property can be the tensile or compressive strength, the bending strength, the elastic limit, or the like.

[0029] The matrix 30 extends substantially along the entire surface of the board 1, *i.e.*, lengthwise between the first end 2 and the second end 3, and widthwise between the first lateral edge 4 and the second lateral edge 5.

[0030] According to the first embodiment of the invention, the insert 31 is arranged centrally in the longitudinal direction. The matrix 30 connects together the first

reinforcement 21 and the second reinforcement 23. A through cavity 32 is provided in the matrix 30 to receive the insert 31. The shapes of the cavity 32 and the insert 31, according to the invention, can be substantially the same, so as to ensure a certain continuity of the core 22. However, the invention is not to be considered limiting in this respect.

[0031] In this case, the insert 31 is shown in the form of an elongated element that extends continuously from the first receiving zone 10 to the second receiving zone 12. The insert 31 is oriented substantially along the longitudinal direction L of the board 1. The insert 31 is located substantially halfway between the first lateral edge 4 and the second lateral edge 5.

[0032] In a plane substantially parallel to the lower surface 6 or to the upper surface 7, according to FIG. 3, the insert 31 has a rectangular cross-section, for example. Its length is preferably comprised between 30% and 80% of that of the board 1, and its width is comprised between 10% and 70% of that of the board 1.

[0033] In a transverse plane substantially perpendicular to the lower surface 6 or to the upper surface 7, according to FIG. 2, the insert 31 has a rectangular cross-section, for example. Similarly to the matrix 30, given that the cavity 32 is a through cavity, the insert 31 connects the first 21 and second 23 reinforcements together. This allows for a continuous framing of the threaded orifices 15.

[0034] Instead of having a parallelepipedic form, as in the case of FIGS. 2 and 3, the insert 31 according to FIG. 4 has a corrugated surface in a central longitudinal plane substantially perpendicular to the lower surface 6 or to the upper surface 7. This undulated surface successively has a first boss 33, a central recess 34, and a second boss 35. The bosses 33, 35 and the central recess 34 correspond to the receiving zones 10,

12 and to the central zone 11 of the board 1, respectively. In fact, the receiving zones 10, 12 are raised with respect to the central zone 11 and the intermediary zones 9, 13. Thus, the receiving zones 10, 12 are sufficiently thick to receive the screws for attaching the retaining devices. The undulated surface follows the profile of the board.

[0035] The matrix 30 is preferably made from a plastic foam, such as a polyurethane foam. The matrix 30 can be constructed otherwise. For example, the matrix could be constructed with a plastic material loaded with low density particles.

[0036] In any case, the matrix 30 has a reduced density, such as between 0.1 kg/dm^3 and 0.6 kg/dm^3. Thus, the matrix 30 contributes to reducing the mass of the core 22 and, consequently, that of the board 1.

[0037] As for the insert 31, it can be made from a material containing wood. This can be plywood, wood core plywood, a solid piece, a juxtaposition of solid pieces, or other material. The fibers of the wood can be oriented, according to the invention, in the lengthwise direction of the board. The insert 31 can be made otherwise, for example, with a plastic material reinforced with fibers, such as glass, carbon or aramid fibers, or any other material having the properties for storing and returning energy, or other properties desired, Again, according to the invention, the fibers of the insert 31 can be oriented in the lengthwise direction of the board.

[0038] The density of the insert 31 can be comprised between 0.2 kg/dm^3 and 1.2 kg/dm^3, or approximately therebetween.

[0039] A process for manufacturing the board 1 according to the invention will be described hereinafter.

[0040] Such process includes manufacturing the core 22, as well as assembling the constitutive elements of the board.

[0041] The manufacture of the core 22 includes arranging the insert 31 in a first mold that has the form of the core 22, and then making the matrix 30 by injecting plastic foam into the mold. The foam extends about the insert 31 to form the core 22 therewith. It can be provided to add two gluing films in the mold, so as to cover the core 22 on both sides.

[0042] Assembling the constitutive elements of the board 1 includes arranging, in a first mold, a stack that includes the sole 20, the first reinforcement 21, the core 22, the second reinforcement 23, and the protective layer 24. Next, a rise in temperature and pressure affixes the elements together.

[0043] Other manufacturing processes could be provided. The one according to the invention has the advantage of requiring few successive operations, which contributes in reducing the production times.

[0044] The board 1 manufactured according to the invention is relatively inexpensive to manufacture. This is due to the fact that its core 22 is economical. The matrix 30 is made in one single phase, and the foam constituting it is inexpensive. The insert 31 has reduced dimensions compared to those of the board, and it also has a simple geometry. In particular, the shape of the insert is quick to carry out.

[0045] The board 1, according to the first example, with its central longitudinal insert 31, is well-adapted for achieving acrobatic moves, particularly in cases where the board 1 must store and return energy by bending along a transverse axis. The insert 31 acts like a blade-shaped spring. Thus, the board 1 benefits substantially from the technical

advantages of a wooden core while substantially having the economical advantages of a foam core. The core 22 uses the quantity of wood that is strictly necessary and arranged where appropriate for obtaining the desired behavior in steering.

[0046] The second embodiment of the invention is described hereinafter by means of FIGS. 5 and 6.

[0047] For reasons of convenience, it is primarily the differences with respect to the first example that are shown. In this second embodiment, the inserts are arranged along the edges of the core.

[0048] A board 50 extends longitudinally between a first end 51 and a second end 52, transversely between a first lateral edge 53 and a second lateral edge 54, and in height, between a lower surface 55 and an upper surface 56.

[0049] Again, the board 50 has, from the first end 51 to the second end 52, a first end zone 57, a first intermediary zone 58, a first receiving zone 59, a central zone 60, a second receiving zone 61, a second intermediary zone 62, and a second end zone 63.

[0050] The board 50 has, preferably in height, a sole 70, a first reinforcement 71, a core 72, a second reinforcement 73, and a protective layer 74.

[0051] According to the invention, the core 72 of the second embodiment has a matrix 80 made from a filler material, a first lateral insert 81 and a second lateral insert 82 being housed in the matrix 80. Each of the lateral inserts 81, 82 has at least a mechanical property greater than that of the matrix 80, which property can be the tensile or compressive strength, the bending strength, the elastic limit, or the like.

[0052] Again the matrix 80 extends substantially along the entire surface of the board 50, *i.e.*, lengthwise between the first end 51 and the second end 52, and widthwise between the first lateral edge 53 and the second lateral edge 54.

[0053] According to the second embodiment of the invention, the matrix 80 connects together the first reinforcement 71 and the second reinforcement 73. A first non-traversing cavity 83 and a second non-traversing cavity 84 are arranged in the matrix 80 to receive the inserts 81, 82, respectively. Preferably, the forms of the cavities 83, 84 and of the inserts 81, 82 are the same or substantially the same.

[0054] Each of the inserts 81, 82 is shown in the form of an elongated element that extends continuously from the first intermediary zone 58 to the second intermediary zone 62. Each of the inserts 81, 82 is oriented substantially along the length of the board 50. The first insert 81 edges the first lateral edge 53. In comparison, the second insert 82 edges the second lateral edge 54.

[0055] In a plane substantially parallel to the lower surface 55 or to the upper surface 56, according to FIG. 5, each insert 81, 82 has ends 85, 86, 87, 88 that are relatively narrow, and a center 89, 90 that is wider than the ends, respectively. This allows, along the board 50, a variation in the capability of the board to store and return energy along a transverse direction. The storage and return are greater where the inserts 81, 82 are wider, in this case, in the central zone 11 between the user's feet.

[0056] In the direction of the height of the board 50, according to FIG. 6, the thickness of each insert 81, 82 is preferably substantially constant. This makes it easier to manufacture.

[0057] Each of the inserts 81, 82 takes support on the first reinforcement 71, on the side of the sole 70. This allows for each insert to be as close as possible to the sole. Consequently, during a lateral edge setting, an insert 81, 82 receives a portion of the steering forces.

[0058] As structured, the board 50 according to the second embodiment is adapted to a steering that requires precise edge settings. The lateral arrangement of the inserts 81, 82 promotes a precise negotiating of the board 50 in a curve, particularly on hard ground, such as packed or icy snow.

[0059] The materials and manufacturing processes that are used for the board 50 according to the second embodiment are identical or similar to those used for the board 1 according to the first embodiment.

[0060] The third embodiment of the invention will be described hereinafter with reference to FIGS. 7 and 8.

[0061] For reasons of convenience, it is essentially the differences with respect to the other examples that are shown. In this third embodiment, an insert is centrally arranged in the longitudinal direction.

[0062] A board 100 extends longitudinally between a first end 101 and a second end 102, transversely between a first lateral edge 103 and a second lateral edge 104, and in height, between a lower surface 105 and an upper surface 106.

[0063] Again, the board 100 has, from the first end 101 to the second end 102, a first end zone 107, a first intermediary zone 108, a first receiving zone 109, a central zone

110, a second receiving zone 111, a second intermediary zone 112, and a second end zone 113.

[0064] The board 100 preferably has, in height, a sole 120, a first reinforcement 121, a core 122, a second reinforcement 123, and a protective layer 124.

[0065] According to the invention, the core 122 of the third embodiment has a matrix 130 made from a filler material, an insert 131 being housed in the matrix 130, the insert 131 having at least a mechanical property greater than that of the matrix. The insert 131 is arranged centrally in the longitudinal direction. A non-traversing cavity 132 is provided in the matrix 130 to receive the insert 131. Preferably, the forms of the cavity 132 and of the insert 131 are substantially the same; in this case, they are parallelepipedic. The cavity 132 opens out on the side of the first reinforcement 121.

[0066] At least one groove 133 is provided in the matrix 130. Each groove 133 preferably faces the insert 131. Each groove 133 preferably extends along the longitudinal direction of the board. Each groove 133 defines a closed space occupied by a gas, such as air. This space creates a decrease in the weight of the board.

[0067] Generally speaking, the boards 1, 50, 100 according to the invention are manufactured from materials and according to techniques known to one skilled in the art.

[0068] the invention is not limited to the particular embodiments specifically described above, the invention including all technical equivalents that can come within the scope of the following claims.

[0069] For example, each insert can have various forms. An insert can be symmetrical or asymmetrical along a transverse axis of the board. Likewise, an insert can be symmetrical or asymmetrical along a longitudinal axis of the board.

[0070] Several inserts of the same board can have various forms. This allows differentiating the mechanical properties of various parts of the board, laterally and/or longitudinally.